**Lab Tasks 04**

1. A vending machine sells small, packaged, ready to eat items (chocolate bars, cookies, candies, etc.). Each item has a price and a name. A customer can buy an item, using a smart card (issued by the vending machine company) to pay for it. No other payment forms (i.e. cash, credit card) are allowed. The smart card records on it the amount of money available. The functions supported by the system are: Sell an item (choose from a list of items, pay item, distribute item) Recharge the machine Set up the machine (define items sold and price of items) Monitor the machine (number of items sold, number of items sold per type, total revenue) The system can be used by a customer, a maintenance employee (who recharges items in the machines), an administrator (who sets up the machine).
2. In a university there are different classrooms, offices and departments. A department has a name and it contains many offices. A person working at the university has a unique ID and can be a professor or an employee. A professor can be a full, associate or assistant professor and he/she is enrolled in one department. Offices and classrooms have a number ID, and a classroom has a number of seats. Every employee works in an office.
3. We want to model a system for management of flights and pilots. An airline operates flights. Each airline has an ID. Each flight has an ID a departure airport and an arrival airport: an airport as a unique identifier. Each flight has a pilot and a co-pilot, and it uses an aircraft of a certain type; a flight has also a departure time and an arrival time. An airline owns a set of aircrafts of different types. An aircraft can be in a working state or it can be under repair. In a particular moment an aircraft can be landed or airborne. A company has a set of pilots: each pilot has an experience level: 1 is minimum, 3 is maximum. A type of aero plane may need a particular number of pilots, with a different role (e.g.: captain, co-pilot, navigator): there must be at least one captain and one co-pilot, and a captain must have a level 3.
4. Hospitals have an ID, a name and an address. People working in a hospital have an ID, unique in the hospital, surname, name, birth date, address, and number of sons Hospital workers cab be doctors (having a list of specializations), employees (having a role) and nurses. Hospital is divided in departments, having a code, a name, and a number of beds. For each department we know the primary doctor and all the workers. Each department can manage surgery rooms identified by name, ID and number of surgery tables.
5. A real estate agency lists a number of properties of different types for sale. Properties that gets sold are removed from the list, and new ones can be added. The maximum number of properties the agency can handle at a given time is 100. All property entries show the property area in m2, number of rooms, neighborhood name, and price. Description of each of the types of listed properties include: Villa: has a swimming pool or not, and number of adjacent streets Apartment: on which floor? and is there a parking lot? Furnished apartment: furniture quality on a scale 1(best) to 5 Your design should provide : A constructor for each class to initialize all of its attributes A display method that prints the type of the class in addition to its attribute values Suitable access modifiers for all class members \*Please use a dictionary when encountering a new word to you